Better than the real thing

Reality Labs at IU

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Goals / Outline

- Background
- What are Reality Labs?
- Where are they?
- How are they used?
  - Current IU use cases
  - Other potential use cases
- Future outlook

Our inspiration:
VR is interesting and beneficial (beyond gaming)

Mosaic

Indiana University's Active Learning Initiative

Mosaic classrooms represent a rich variety of learning spaces that meet widely varying instructional needs—much like the unique tiles that comprise a mosaic.

The Mosaic Initiative is IU's active learning Initiative inspired by and tied to Mosaic classrooms.

| active learning space

mosaic.iu.edu


INDIANA UNIVERSITY
Mosaic
Indiana University's
Active Learning Initiative
mosaic.iu.edu
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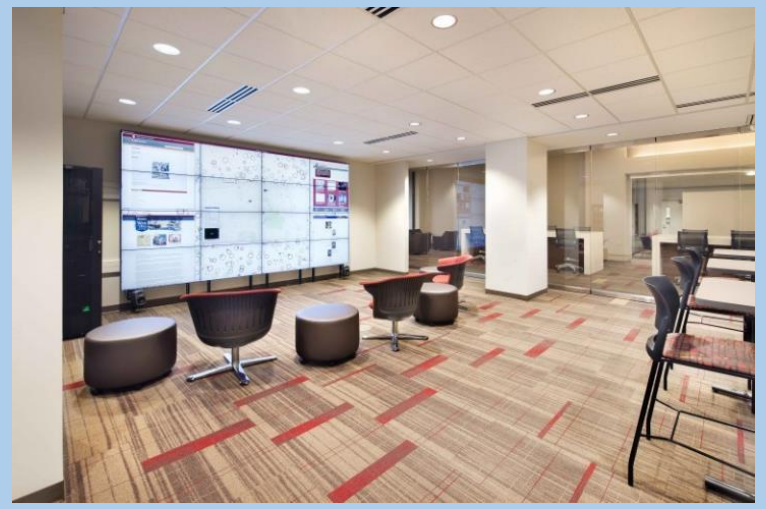
Mosaic

Informal Spaces



Collaboration

Classroom Spaces

Research Technologies
Advanced Visualization Lab (AVL)

Main support unit for visualization activities and technology at IU

20 year history supporting visualization and virtual reality (founded 1997)

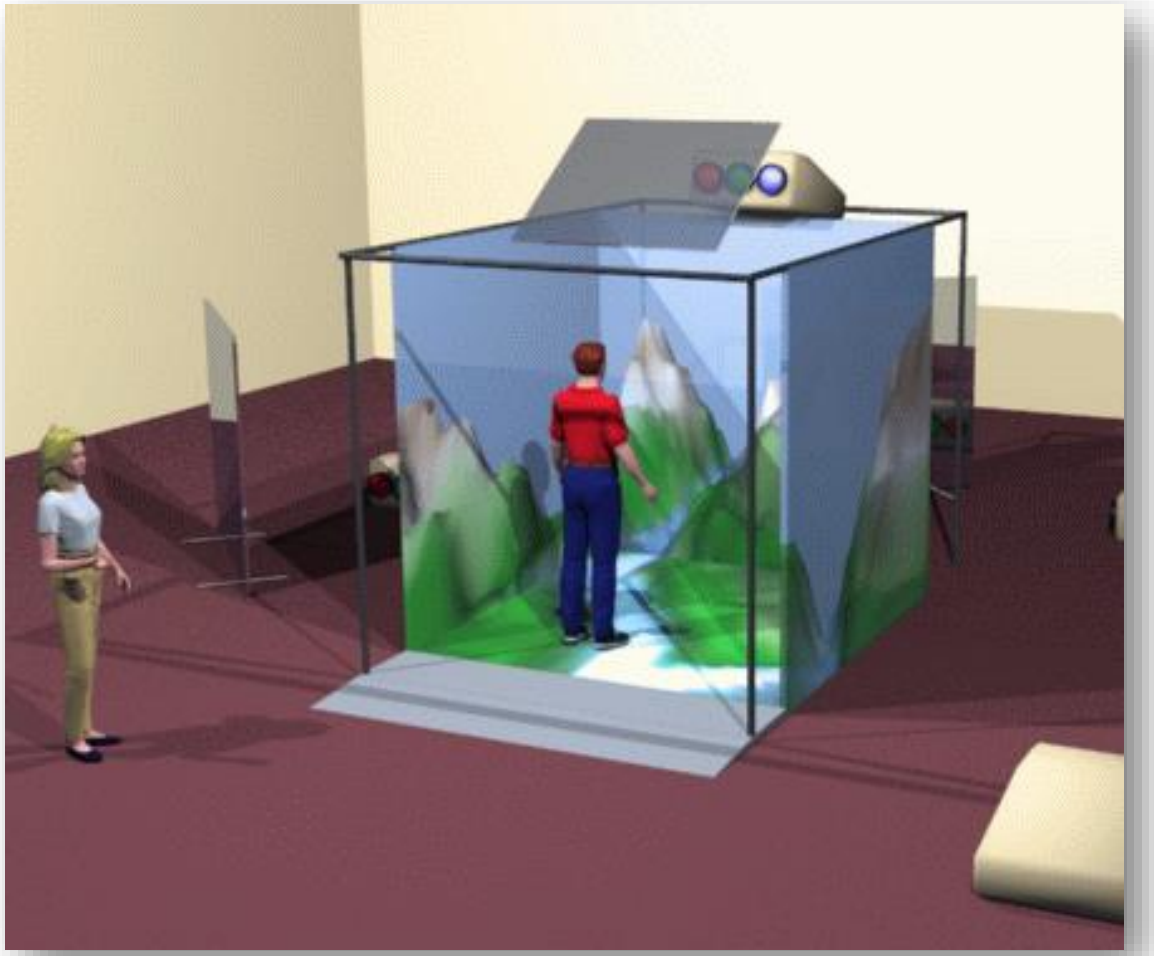
Evolving Technology Strategy

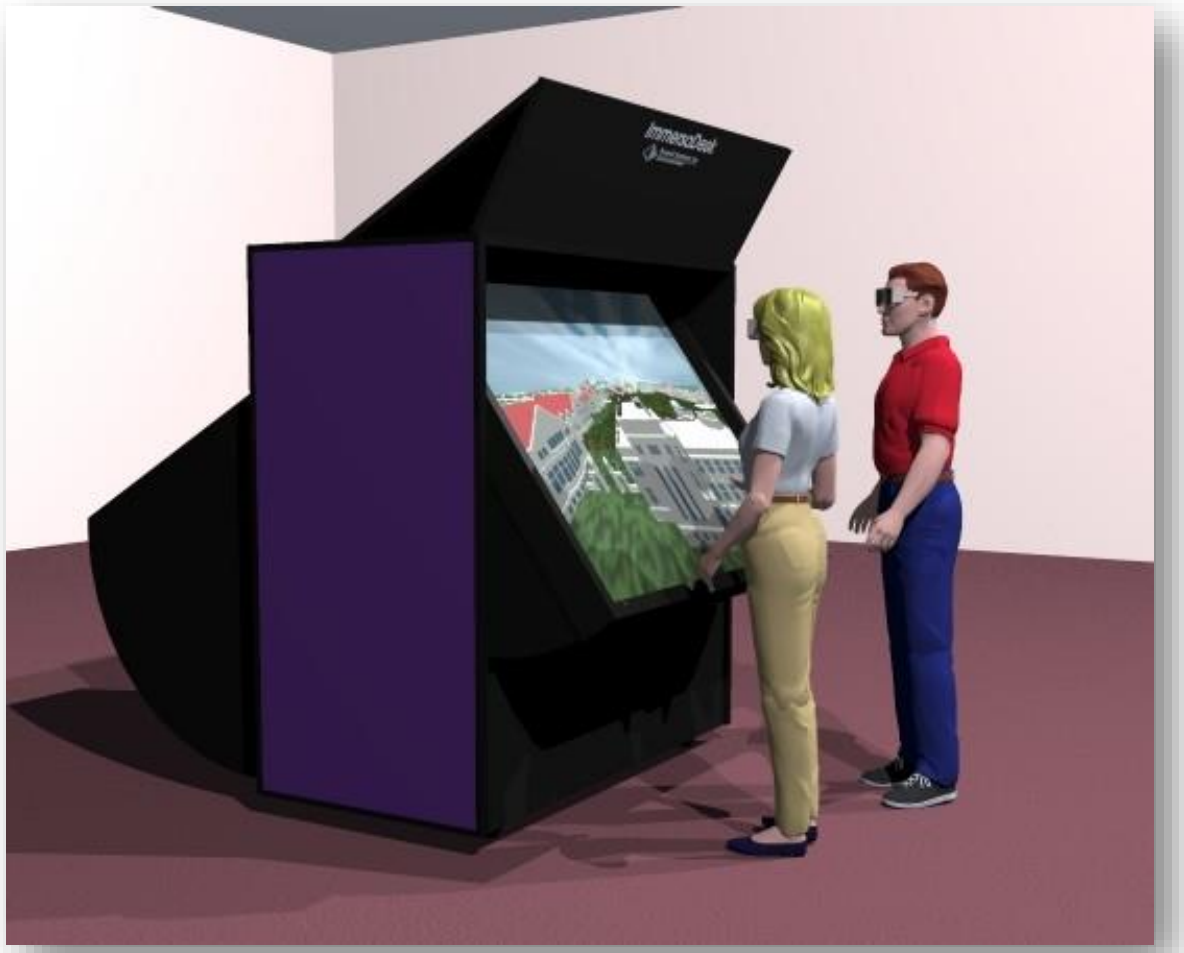
- 1997 – mid early 2000s: “Flagship” facilities only
- mid 2000s – early 2010s: Distributed visualization initiative
- mid 2010s – forward: balance of Flagship and Distributed

AVL - Tech Strategy Influences

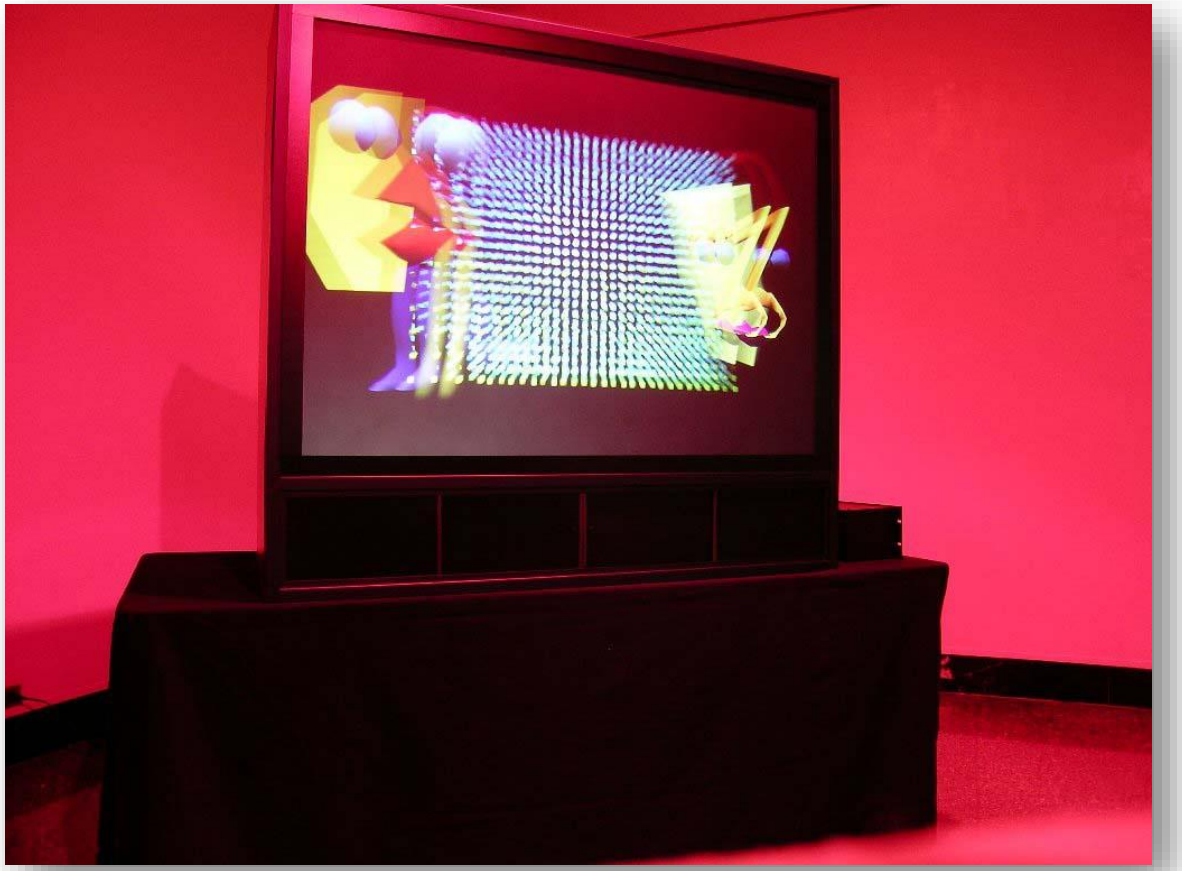
- User Access
- Ease of Use
- Utility across many domains → software
- Commoditization & innovation of technology
- Costs – initial acquisition & refresh; remodeling costs
- Support model – staff, OS, software
- Space (!)
- Impact – users, decision makers, general public

AVL Flagship Facilities – c. 1997





AVL Distributed Vis – c. 2002-2008



AVL Distributed Vis – c. 2011

- Currently 13 IQ-Walls on 3 IU campuses + several external collaborators
- ADS logins in all public spaces

AVL Balanced Vis Strategy – present

Reality Labs - Born from Collaboration!

A logical and fruitful partnership between RT & LT

- Reality Labs meet both unit's objectives
  - Extends RT's Distributed Visualization Initiative
  - Extends LT's Mosaic Initiative
- Capitalize on each unit's strength

Why now?

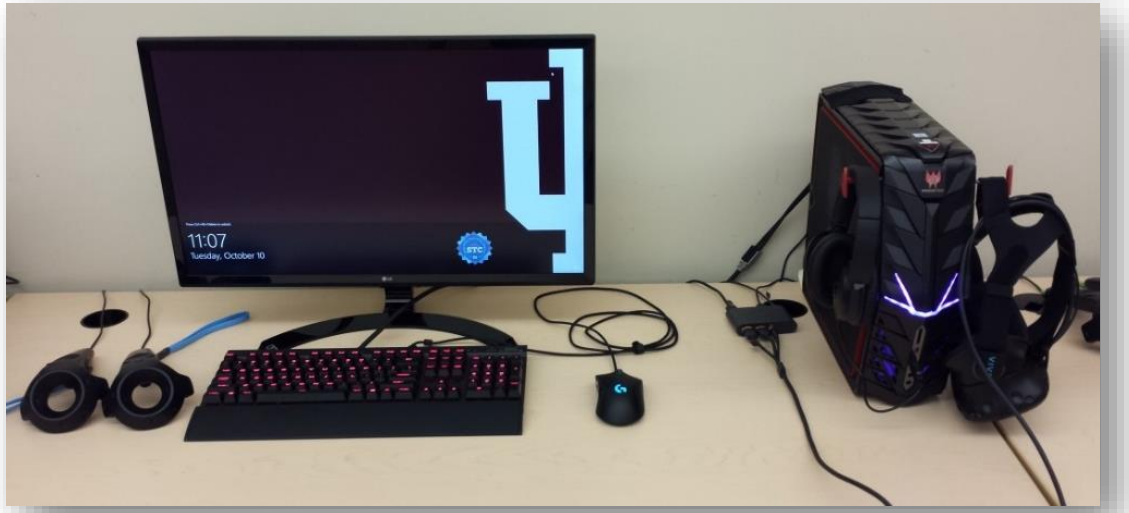
- Inexpensive VR hardware
- Large and accessible VR software library

So what are Reality Labs?

Classroom or lab spaces that contains some number of Reality Stations

Hardware components of a Reality Station

- VR equipment (tracked display + interface devices)
  - Currently prefer HTC Vive HMD, but workflows support Oculus Rift too
- VR-capable computer
  - Acer and now MSI
    - Matt to add specs; photo of new MSI PC
- High-quality monitor
  - High refresh, 4K, and/or HDR



Kirkwood Hall 016

Tracking Installed

Franklin Hall 052

Software environment

Reality Stations are configured for VR, but are great for non-VR uses too...

Windows software

- Unity & Unreal
- Adobe Creative Suite
- Microsoft Visual Studio
- Microsoft Office
- Web browsers
- Misc. utilities

30+ Steam VR applications

- Art & museum apps
- Simulations
- Media players
- Select games & experiences that demonstrate unique interfaces/capabilities of VR

Roles in supporting Reality Labs

Learning Technologies

- STC
  - Reality Lab installation
  - Computer software builds, including Windows OS and Windows software
- TCC
  - Routine check-ups (cable maintenance and cleaning)

Research Technologies

- AVL
  - VR tracking installation
  - Training material for installation & maintenance
  - Identify/develop/document VR software & workflows (Steam apps, Unity)
  - Advanced/custom user support on a per-project basis

Where are Reality Labs?

Location	*Type of space*	*# of Stations*	*Campus*
Kirkwood Hall (016), 2017	Classroom	1	IUB
Franklin Hall (052), 2017	Classroom	10	IUB
Fine Arts (215), 2017	Classroom	10	IUB
IUB Technology Park (IC 105 & CIB), 2017	Lab	2	IUB
Informatics & Communication Technology Complex (Advanced Visualization Lab, rms. 403 & 414), 2017	Lab	8	IUPUI
Fine Arts (School of Art, Architecture + Design DART Lab), 2017	Lab	2	IUB
Wells Library (4th floor UITS 3D Print Lab), 2017	Lab	6	IUB
Hine Hall (UITS Idea Garden, rm. 106), coming in 2018	Lab	2	IUPUI
Additional classrooms and labs (details TBD), coming in 2018	Classrooms & Labs	20-30	IUPUI, IUE, others(?)

How to use Reality Labs?

Use Case	*VR Application*	*Data*	*Complexity*
Integrate existing VR applications and existing data into an existing curriculum	Pre-existing	Pre-existing	*Easiest* Use provided Reality Station with provided or available VR applications and sample data
Use existing VR applications for viewing and interacting with your data	Pre-existing	Your	*Moderate but interesting* Capture or create your own data and use existing VR applications to view it
Develop custom applications for viewing and interacting with your data	Your	Your	Programming required Use Unity (or similar tool) to create your VR environment or application and view your data

Interior spaces and furniture design

Jon Racek

IUB School of Art, Architecture + Design

Existing App + Your Data

New interface to 3D design and review – improved sense of scale and perception

Fortune 500 company Kimball asked Racek's students to help imagine new co-working spaces. The students used VR to present their final proposals to Kimball in a much richer way than computer renderings would have allowed.

Digital art

Margaret Dolinsky

IUB School of Art, Architecture + Design

Your app + Your data

Recurring Themes:

- Capturing the imagination
- Promoting digital technologies
- Redefining virtual reality

“My goal is to have students bring their imagination and research interests to the virtual worlds they create. I like them to define virtual reality as its own medium, separate from the tropes used in video games or cinema, and to concentrate on how they offer an experience to their visitors.”

Virtual reconstruction & preservation

Zeb Wood, Albert William, Andrea Copeland

IUPUI School of Informatics and Computing

Your app (reusable) + Your data

Lots of student involvement from multiple SOIC classes

Bethel Church

- Historic site in Indianapolis
- Currently funded by New Frontiers/New Currents Grant at IU

Other sites

- IUPUI campus
- Washington St, Indianapolis 1928
- Architectural site in Paros, Greece

Looking for new partners

- Zeb: zwood@iupui.edu
- Albert: almwilli@iupui.edu

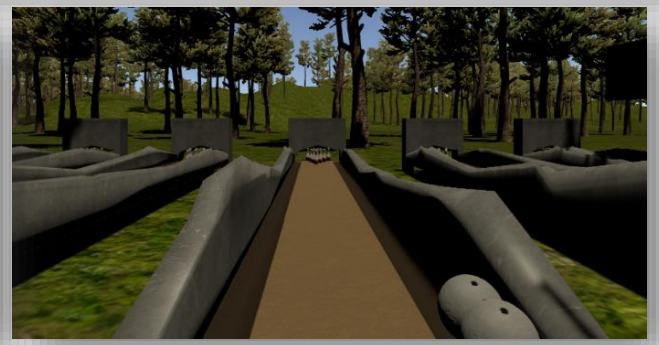
Introduction to VR

Bill Sherman

IUB School of Informatics, Computing, and Engineering

Technical course: input devices, output devices, methods of travel, interaction methods, VR application examples, programming

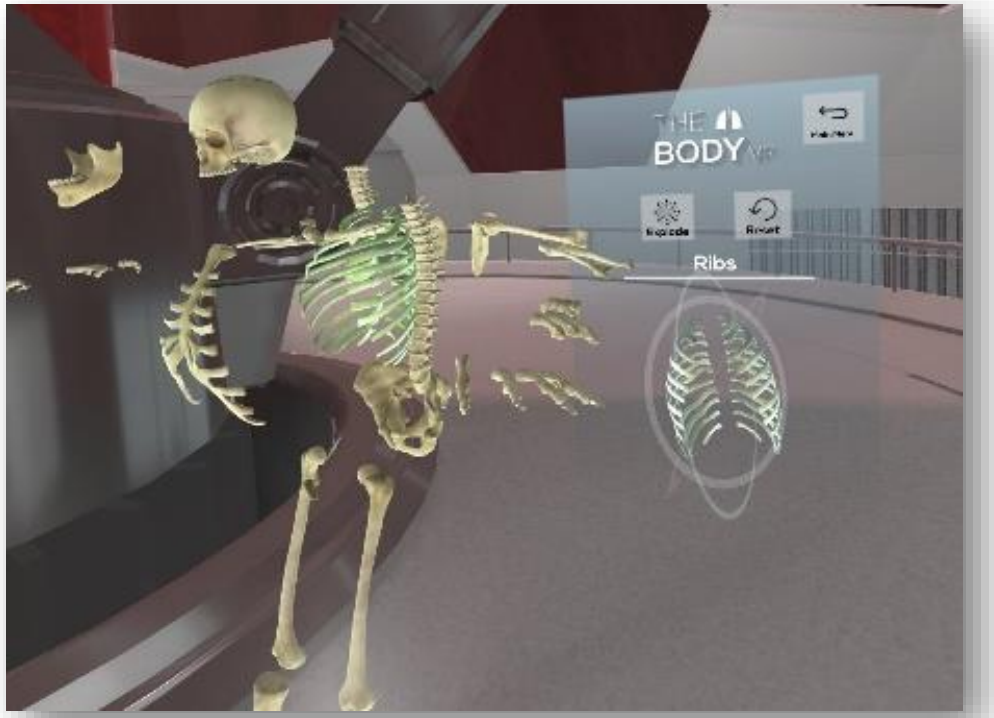
"Students can now spend hours exploring VR applications on their own. In the past, we were limited to only 5-10 minute experiences during dedicated demo sessions."

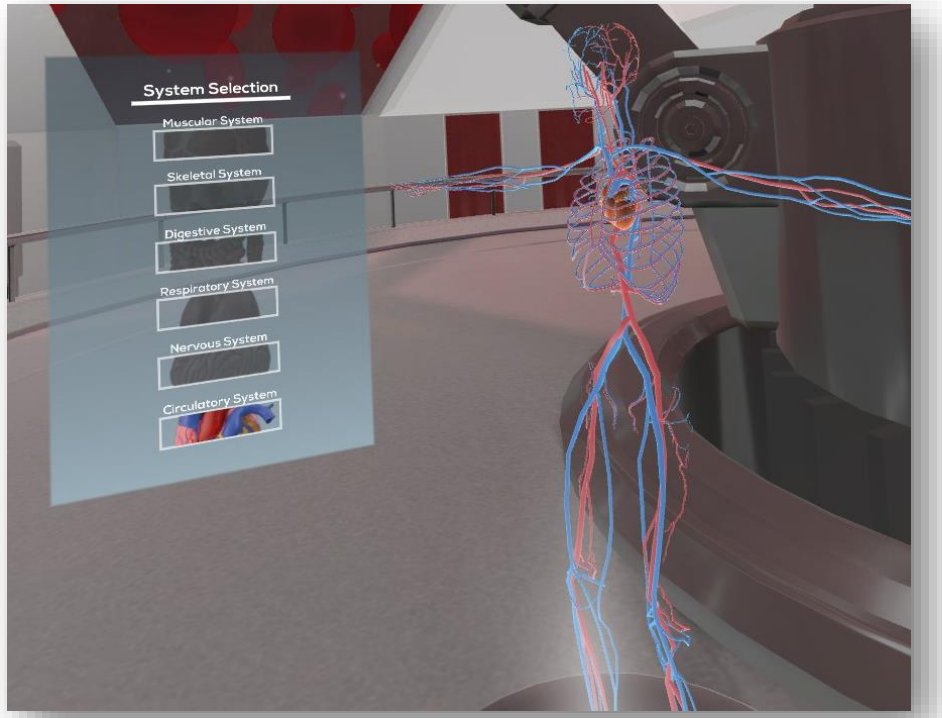


Intro to VR course Spring 2017

But we're just scratching the surface…
Lots of good apps for a variety of disciplines

Anatomy - *The Body VR: Journey Inside a Cell*





Interactive explode and selection modes for 6 human body systems

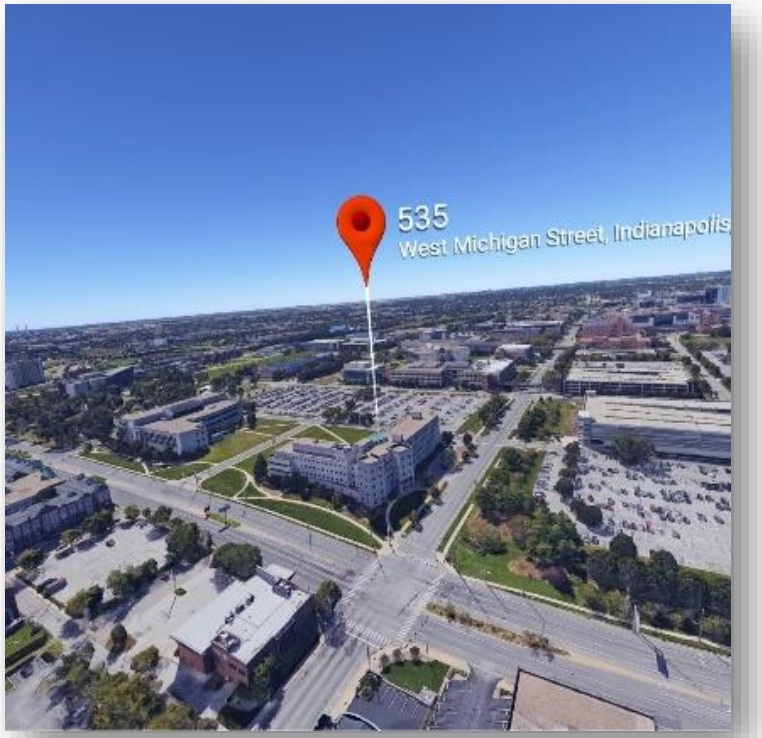
… other good apps for a variety of disciplines

VR Storytelling & Historic Recreation - *Apollo 11*

Cinematic & interactive modes

... other good apps for a variety of disciplines

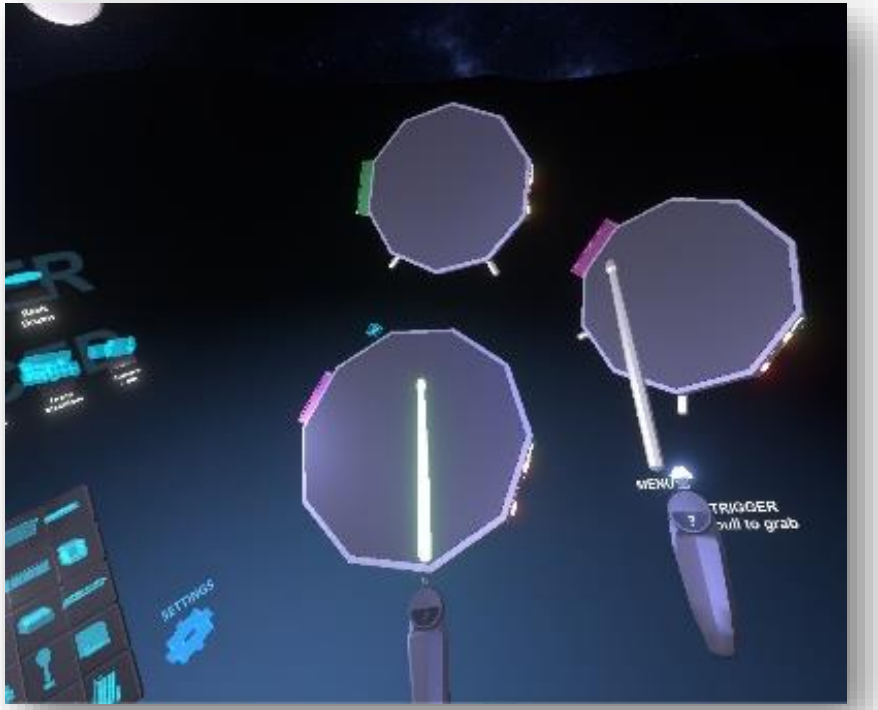
Geography - *Google Earth VR*



Great interface orientation & landmark tour mode

… other good apps for a variety of disciplines

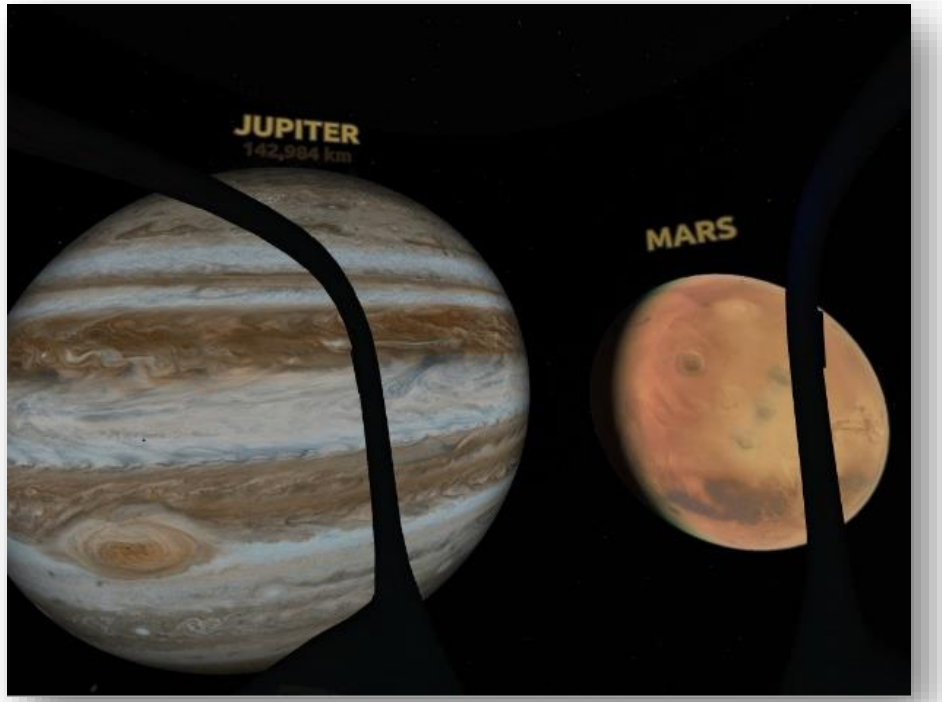
Music - *SoundStage*



Variety of instruments

… other good apps for a variety of disciplines

Astronomy - *Titans of Space*



Comparison, interactive, and tour modes

… other good apps for a variety of disciplines

Media playback - *Simple VR Video Player*

Support for spherical & planar media (mono & stereo)
Excellent VR file browser

What about the future of Reality Labs?

IDEA GARDEN

CREATIVE LAB

COMING SPRING 2018

IUPUI - Hine Hall

A UITS STUDENT TECHNOLOGY CENTER PROJECT

INDIANA UNIVERSITY

Future Plans for Reality Labs

New locations

- IUPUI Classrooms (Departmental) & UITS Idea Garden
- IU East Lab – Nursing & Business
- Other locations/campuses under discussion – talk to us about your interest in partnering!

Other technology

- Support for other types of “Reality”
  - Augmented Reality - headsets & tablets
  - Capturing Reality - 3D printing, scanning, and media capture
- Mobile computing (HMD, ibackpack, or phone)
- Inside-out tracking: SLAM (simultaneous localization and mapping)

Challenges supporting Reality Labs

- Ironing out the kinks
- Windows build and deployment challenges
- Wireless or self-contained HMDs
- Purchasing process with Steam (VR software library)
- Documentation for installation & training
- VR apps change quickly
- Non-STC locations may require local IT support (not affiliated directly with UITS)
- Individuals requesting other VR or AR tech

Thank You

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